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THE TRIMORPHODON (LYRE SNAKE) OF CALIFORNIA, WITH NOTES ON THE SPECIES OF THE ADJACENT AREAS

BY

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THE TRIMORPHODON (LYRE SNAKE) OF CALIFORNIA, WITH NOTES ON THE SPECIES OF THE ADJACENT AREAS

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GENERAL

Cope described the opisthoglyph genus, *Trimorphodon,* in 1861[1], type species *lyrophanes,* from Lower California. The genus is now known to range from the southern border of the United States south through Mexico and Central America to Panama. In the United States it occurs in Texas[2], Arizona and Southern California. It may be expected in Southern New Mexico. The present notes have reference primarily to the species inhabiting California, with comparative data on specimens from Arizona and Lower California.

Available Material.—In 1924[3] I described as a new species, *Trimorphodon vandenburghi,* based on the first specimen of the genus from California recorded in the literature. This specimen appeared to be sufficiently different from *Trimorphodon lyrophanes,* as taken in Arizona and Lower California, to warrant specific distinction.

Subsequently, my attention was called by Dr. F. N. Blanchard to an earlier California specimen in the U. S. National Museum (No. 56327); this was taken by the late Julius Hurter at Claremont, Los Angeles County, in 1910, but had not previously been mentioned in the literature.

I am advised by Dr. Joseph Grinnell, of the University of California, that in September, 1919, he was shown a specimen of *Trimorphodon* taken by Dr. Cecil Reynolds in the San Gabriel River Canyon, near Azusa, Los Angeles County. This specimen, unfortunately, I have been unable to trace, but the locality record is of interest.

In 1927, through the courtesy of Miss Sarah R. Atsatt, I examined

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[1]Proc. Acad. Nat. Sci. Phila., 1861, p. 297.

[2]Copeia, 1925, No. 138, p. 7.

[3]Bull. San Diego Zool. Soc., 1924, No. 1, pp. 17-18.

a California specimen from Tahquitz Creek, near Palm Springs, Riverside County; this was taken by B. Silver, January 2, 1927, and is now No. 10499 in the collection of the University of California.

In addition to these, I have personally collected in San Diego County, during the years 1926 and 1927, seven specimens, four alive and three found crushed by automobiles upon the highway.

Thus, a total of ten California specimens is now available for study and it is possible to point out with greater certainty the differences between the California *T. vandenburghi* and the Arizona-California *T. lyrophanes*. Of the latter species I have examined two specimens in the collection of the California Academy of Sciences through the kindness of Mr. J. R. Slevin, while eleven specimens in the U. S. National Museum have been available for study through the courtesy of Dr. L. Stejneger. Also, Miss Doris M. Cochran has kindly checked for me the two co-types in the U. S. National Museum collection. Summarizing the material, there have been available ten California, five Arizona and ten Lower California specimens of the genus.

Differences between T. lyrophanes and T. vandenburghi.—The consistent differences between the two species may, I think, be referred to under the following heads: (1) Anal plate; (2) Body spots; (3) Coloration.

Of the Arizona-Lower California specimens *(T. lyrophanes)*, there are fourteen specimens in which the character of the anal plate can be determined, and, of these, one (U. S. N. M. No. 4680, co-type) has the anal entire. Of the California specimens *(T. vandenburghi)*, nine specimens are determinate and, of these, one (U. C. No. 10499) has a divided anal plate. Thus, in this characteristic, which is evidently variable in the genus, the California specimens tend definitely toward an undivided plate (11 percent divided, 89 percent undivided), while in the Arizona-Lower California specimens the contrary is true (93 percent divided, 7 percent undivided).

The variations in the body spots may be tabulated as follows:

	Number of Specimens	Body Spots		
		Max.	*Min.*	*Average*
T. vandenburghi	10	42	30	36.1
T. lyrophanes	12	33	21	27.5

While there is some overlapping, there is a definite tendency toward a higher number of spots in *T. vandenburghi*. Only one specimen from California has as few spots as the maximum from Arizona-Lower Cali-

fornia; only three of the latter have as many spots as the minimum of the former.

As to color, the differences cannot be put in statistical form. In general, it may be said that *T. vandenburghi* is the darker and browner of the two. The pattern of this snake is primarily a series of dark brown hexagonal dorsal blotches on a lighter brown ground color. In *T. lyrophanes* the ground color is gray rather than brown, and the dorsal rhombs are of a lighter shade. In *T. vandenburghi* the lighter cross marks which split each dorsal blotch are ordinarily less distinct than in *T. lyrophanes*. The lower labials, chin shields and under-surface of the neck are more generally spotted in *T. vandenburghi* than in *T. lyrophanes*. With the exception of two or three faded adult specimens, coloration alone permits segregation at a glance in the case of the twenty-five specimens I have examined.

Little has been written concerning *Trimorphodon,* because specimens of the snake do not often come into the hands of collectors. For this reason the following notes on these specimens may be of interest. The life notes are based on observations of the five living specimens of *T. vandenburghi* that I have collected in San Diego County.

TRIMORPHODON VANDENBURGHI

Range.—This snake ranges in California at least from Los Angeles County south to the Mexican line and from the ocean to the desert foothills. It has been collected at the following localities:

Los Angeles County,
- Claremont (Lower Sonoran
- San Gabriel Canyon (Upper Sonoran)

Riverside County,
- Tahquitz Creek (Lower Sonoran)

San Diego County,
- Wildwood Ranch (Upper Sonoran). Type Locality
- Viejas (Upper Sonoran)
- Dulzura (Upper Sonoran)
- Flynn Springs (Lower Sonoran)
- Shady Dell (Upper Sonoran)
- San Pasqual (Lower Sonoran)
- San Onofre (Upper Sonoran)

The altitudes of these localities vary from 60 ft. (San Onofre) to

2900 ft. (Viejas). Only one specimen is from the desert side of the mountains (Tahquitz Creek).

Scutellation.—Scale rows 21, 22 or 23. Ventrals: females 233 to 242, average 237; males 220 to 242, average 231. Anal generally entire (8 entire, 1 divided). Caudals: females 66 to 68 pairs, average 67; males 66 to 80 pairs, average 72. Supralabials usually 8 or 9, rarely 10; infralabials usually 11 or 12, rarely 13. Preoculars 2 or 3, normally 3; postoculars 2 or 3, normally 3. Loreals 2 with a third or subloreal usually present below the posterior loreal. Temporals 2+3, 3+3, 3+4 or 4+5; generally 2+3 or 3+4.

Color and Pattern.—The ground color above is brown (straw color in young specimens), darkened on the sides by a multiplicity of black dots, which, however, are generally absent in the scale rows nearest the body blotches, thus causing the latter to stand out more clearly. Upon the ground color is superimposed a series of roughly hexagonal chocolate brown blotches, which constitute the distinctive pattern. These blotches are considerably darker on the edges ond are usually split transversely with an irregular light brown band one scale wide and of a tone similar to the ground color. The dividing bands are usually less evident posteriorly. On the sides, the dorsal blotches taper into dark bands one or two scales wide which engage the ventrals. The dorsal blotches number from 30 to 42 (average 36.1) on the body and from 13 to 18 (average 15) on the tail. On the sides, interspersed between the prolongation of the main blotches there is a second series of dark brown marks, thus doubling the frequency of the marks on the sides. Occasionally, particularly toward the tail, members of this second series completely cross the dorsal area between the primary blotches. The secondary series likewise engages the ventrals. Sometimes a tertiary series is in evidence on the ventrals between the primary and secondary. The ventral color in life is a translucent yellowish white.

The upper surface of the head is cholocate brown with a gray lateral band across the front of the prefrontals. A second, more prominent, transverse band crosses the center of the frontal and supraoculars, thence turns back behind the eye to the angle of the mouth. There is usually a third light mark on the head in the shape of a "Y" with the apex at the posterior point of the frontal and the branches engaging the neck. A light chevron usually joins the branches of the "Y". It is this last pair of marks that gives this snake its common name of Lyre Snake. The supralabials are white or straw edged with brown. The

anterior infralabials and genials are generally flecked with brown dots. The colors in this species are more iridescent than any other snake in this area.

The dorsal blotches are darkest and the ground color is lightest in the young specimens, which are consequently more conspicuously marked. The adults are more faded and with less contrast.

The eye in life is greatly protuberant. The pupil is vertical. The iris is flecked with gray and green.

Dimensions.—The largest specimen I have seen, a female, measured (in life) 832 mm. (32.75 in.) over-all; tail length 102 mm. (4 in.). The tail of this specimen is not quite complete. It may be noted that these snakes have a finely tapered tail, an undetermined portion of which is not infrequently missing. In the complete specimens the ratio of the tail length to total length is, in the females about .14, and in the males .16 (.155 to .167).

Field and Life Notes.—Although San Diego County has been rather thoroughly worked over by herpetologists, no *Trimorphodon* had been reported prior to 1924. During the past five years, among over 3000 live snakes from San Diego County brought into the reptile house of the San Diego Zoological Society by amateur collectors, there has been not a single *Trimorphodon.* Every other of the twenty-five species and subspecies of snakes now known to inhabit this area, except one—*Phyllorhynchus decurtatus*—was represented in this gathering. It would therefore appear that *Trimorphodon,* although it must be fairly common and well distributed in this section, is not only nocturnal, but secretes itself in a particularly effective manner. Another nocturnal snake, *Hypsiglena ochrorhynchus,* is often taken under small stones or rock flakes, but my experience in the taking of five live specimens of *Trimorphodon* leads me to believe that this snake deliberately seeks deeper and safer recesses.[4]

In two cases snakes were discovered by raising large and close-fitting cap rocks. In another instance the specimen was under a heavy fragment leaning on the side of a boulder but not touching the ground. In the final case which resulted in the capture of two specimens, a thin section of the body of one snake was visible from the surface, deep in a crack between two boulders. This was in the afternoon of a dark and

[4]While these notes were in press a *Trimorphodon* was brought in to the Zoological Society by Bert C. Walker. It was collected on the slope of Mt. Helix, San Diego County, and was found under an old horse-collar pad lying with other debris near a burned house. The specimen has 31 body spots and anal entire.

foggy day. So large were the boulders that it took an hour's work on the part of two collectors armed with pinch bars, to extricate the snakes. In my collecting work I have broken off thousands of granite flakes from parent boulders, this being a fruitful collecting method for the taking of a number of species of snakes and lizards, but so far I have failed to find a *Trimorphodon* under so precarious a protection.

At one time I thought that *Trimorphodon* in San Diego County was restricted to the granite boulder area, for not only were the five live specimens taken in granite, but the first two found dead in the road were in granite country. However, the latest specimen was found on the state highway south of San Onofre, less than a mile from the ocean shore and distant from any rock-strewn area. In such localities ground holes must constitute the daylight refuge.

T. vandenburghi has been taken in January, March, April, May, July and September.

In captivity, *Trimorphodon vandenburghi* is rather vicious, particularly if cornered. While practically helpless in the light, it strikes with fair accuracy in the dark. The tail is rapidly vibrated when the snake is annoyed. When frightened, it progresses with the anterior part of the body raised well off the ground. I was bitten by one specimen without noting a result differing from the bite of any harmless snake. However, the posterior teeth probably did not take effect and the snake was given no opportunity to chew.

"The posterior maxillary tooth elongate, grooved" (Cope), was with difficulty uncovered even in the largest specimen. It was, I should say, about 3 mm. in length, and very sharp and fine.

While the natural food of the species is not known, lizards probably constitute a part of the diet, as some specimens took *Xantusia henshawi* in captivity. However, the feeding is not easily observed, as the snakes would only feed naturally in the dark and it was therefore necessary to leave the food in the cage. In the instances that I have observed, the snakes fed without constriction. I noted no poisoning effect on the prey, such as was seen by Duges[5].

TRIMORPHODON LYROPHANES

Range.—This snake has been recorded from the following localities in Lower California and Southern Arizona:

[5]La Naturaleza (Mexico), 1884, Vol. VI, pp. 145-148. Translation in Stejneger, Annual Report of U. S. N. M. for 1893 (1895), pp. 348-349.

LOWER CALIFORNIA

Cape San Lucas (Type Locality)
La Paz
Santa Anita
Miraflores
San Jose del Cabo
Sierra San Lazaro
Santa Rosalia

ARIZONA

Santa Cruz County,
    Fort Buchanan
    Cayetano Mountains, near Calabasas
Cochise County,
    Fort Huachuca
Pima County
    Tucson Range
    Rosemont

There are several other records which are indefinite, as, for instance, "Southern Arizona," "Lower California," etc. There is in the British Museum[6] a skull referred to *Trimorphodon biscutatus* from "San Ramon, Mexico." This might be either of two San Ramons in Lower California. The definite localities of the specimens of *T. lyrophanes* and *T. vandenburghi* are indicated in Plate 22. Two other localities in mainland Mexico where other species of the genus have been taken are also indicated.

Scutellation.—Scale rows usually 22 or 23; rarely 20, 21 or 24. Ventrals: 223 to 243, average 232. Anal generally divided (13 divided, 1 entire). Caudals 68 to 81 pairs, average 73. Supralabials usually 8 or 9, rarely 7 or 10; infralabials 10 to 14. Preoculars 2 or 3, normally 3; postoculars normally 3, rarely 4. Loreals two with a posterior subloreal usually present. Temporals 2+3 or 3+4, occasionally 2+4 or 3+3. Body spots 21 to 33, average 27.5, tail spots 10 to 14, average 12.

Food.—Two of the National Museum specimens had eaten lizards. Ditmars[7] gives the food (of the genus) as lizards, young snakes and batrachians. Van Denburgh[8] states that a captive specimen "was very pugnacious."

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[6]Boulenger, 1896, Cat. Snakes, Vol. III, p. 55.
[7]The Reptile Book, 1908, p. 389.
[8]Occ. Pap. Cal. Acad. Sci., X, 1922, Vol. II, p. 887.


Los Angeles
CALIFORNIA
San Diego
Ensenada
PACIFIC
LOWER
GULF OF CALIFORNIA
OCEAN
Phoenix
ARIZONA
NEW MEXICO
Tucson
SONORA
CHIHUAHUA
Hermosillo
Guaymas
SINALOA
La Paz
TRIMORPHODON LOCALITY RECORDS
0 25 50 100 200
Scale of Miles
Trimorphodon vandenburghi ●
1 San Gabriel Cañon
2 Claremont
3 Tahquitz Creek
4 Wildwood Ranch
5 Viejas
6 Dulzura
7 Flynn Springs
8 Shady Dell
9 San Pasqual
10 San Onofre
Trimorphodon lyrophanes ▲
11 Cape San Lucas
12 La Paz
13 Santa Anita
14 Miraflores
15 San Jose del Cabo
16 Sierra San Lazaro
17 Santa Rosalia
18 Fort Buchanan
19 Cayetano Mts
20 Fort Huachuca
21 Tucson Range
22 Rosemont
Trimorphodon lambda ■
23 Guaymas
Trimorphodon upsilon +
24 Batopilas

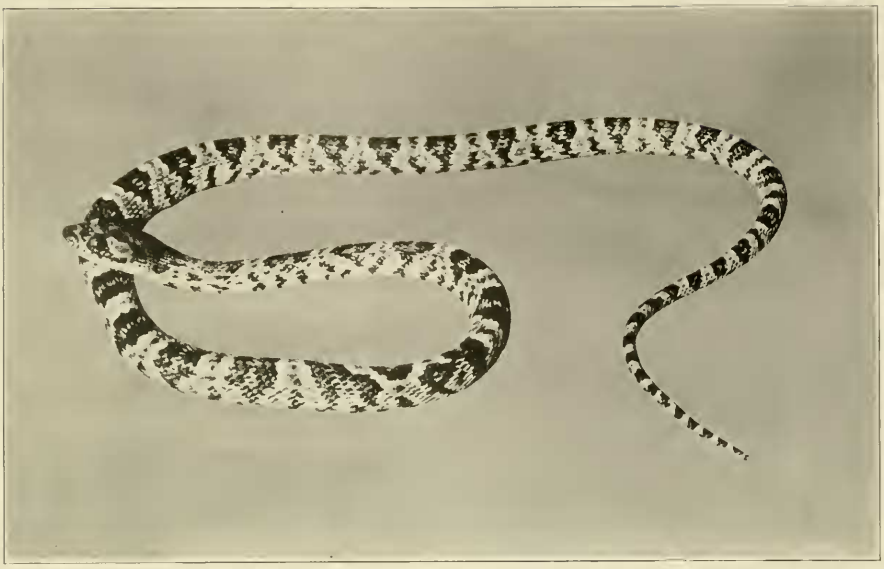

Fig. 1. *Trimorphodon vandenburghi*

Fig. 2. *Trimorphodon vandenburghi.* Dorsal view of head, showing lyre-shaped marks from which the snake derives its common name.